

5           **OPTIMIZED FIXED-POINT MATHEMATICAL LIBRARY AND  
GRAPHICS FUNCTIONS FOR A SOFTWARE-IMPLEMENTED  
GRAPHICS RENDERING SYSTEM AND METHOD  
USING A NORMALIZED HOMOGENOUS COORDINATE SYSTEM**

**ABSTRACT OF THE DISCLOSURE**

10           A software-implemented graphics rendering system and method designed  
and optimized for embedded devices (such as mobile computing devices) using  
fixed-point operations including a variable-length fixed point representation for  
numbers and a normalized homogenous coordinates system for vector  
operations. The graphics rendering system and method includes a fixed-point  
15   mathematics library and graphics functions that includes optimized basic  
functions such as addition, subtraction, multiplication, division, all vertex  
operations, matrix operations, transform functions and lighting functions, and  
graphics functions. The mathematical library and graphics functions are modified  
and optimized by using a variable-length fixed-point representation and a  
20   normalized homogenous coordinate system (NHCS) for vector operations.